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(71) Applicant: **DAINIPPON PRINTING CO LTD**

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(72) Inventor: **SHIBUYA TAKEKI**

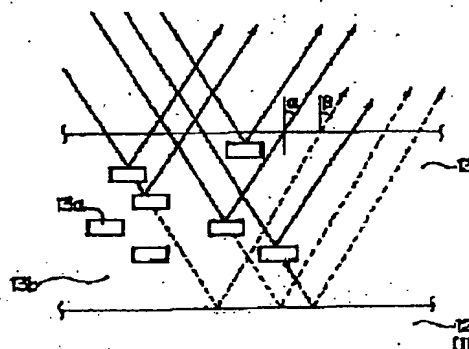
(54) **COLOR CHANGE CARD**

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(57) Abstract

**PROBLEM TO BE SOLVED:** To provide the forgery prevention effect, inexpensive and suitable for a small lot by containing an image treated layer formed of colored and transparent ink in a manner that a part of the image treated layer is overlapped on a color change printing layer.

**SOLUTION:** A color change printing layer 13 is formed on the surface of a card base 11, and a part of the color change layer is overlapped on an ordinary printing layer 12, and an image is formed by using color change ink to be color changed by a first angle  $\alpha$  and a second angle  $\beta$ . An image is formed on the color change printing layer 13 by using the color change ink in which a pigment 13a prepared by laminating a high refractive index layer and a low refractive index layer in a transparent medium 13a. A card having visual effect and forgery prevention effect and changing colors by the angles can be formed easily and inexpensively by the arrangement.



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**CLAIMS****[Claim(s)]**

[Claim 1] A color change card containing a card base material which has a reflecting surface, a color change printing layer formed in the surface of said card base material using color change ink which carries out color change according to the 1st or 2nd direction, and an image-processing layer formed in ink with colored and transparency so that at least a part might overlap said color change printing layer.

[Claim 2] It is the color change card which usually used and formed ink in the surface of said card base material in a color change card according to claim 1 and with which it usually has a printing layer and said color change printing layer is characterized by said thing [ being formed so that at least a part may usually overlap a printing layer ].

[Claim 3] It is the color change card characterized by distributing a pigment which carried out the laminating of a high refractive-index layer and the low refractive-index layer into data medium with said transparent color change ink in a color change card according to claim 1 or 2.

[Claim 4] It is the color change card characterized by forming said image-processing layer by printer of a sublimation imprint method in a color change card given in any 1 term of claim 1 to claim 3.

[Claim 5] It is the color change card characterized by said image-processing layer containing a photograph of his face of a card carrier in a color change card given in any 1 term of claim 1 to claim 4.

[Translation done.]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the color change card used by the incident angle of light suitable for cards, such as a mag-stripe card, a whole surface magnetic card, an IC card, and an optical card, or an ID card, concerning the color change card from which a tint changes.

[0002]

[Description of the Prior Art] What imprinted the transparence hologram layer on the maximum surface as a conventional card for for example, forged prevention or differentiation of other cards is known.

[0003]

[Problem(s) to be Solved by the Invention] However, the conventional card mentioned above had the problem that advanced technology and an expensive material are needed for forming a transparence hologram layer, and the correspondence to a small lot design was difficult, and the manufacturing cost of a card rose.

[0004] With the angle to see, this invention makes it a technical problem cheap and to provide a small lot with the color change card with which the forged prevention effect is acquired while a visual effect with the image of the upper colored transparency is acquired.

[0005]

[Means for Solving the Problem] In order to solve said technical problem, invention according to claim 1 So that at least a part may overlap a color change printing layer (13) formed in the surface of a card base material (11) which has a reflecting surface, and said card base material using color change ink which carries out color change according to the 1st or 2nd direction, and said color change printing layer It is made for an image-processing layer (15) formed in ink with colored and transparency to be included.

[0006] Invention of claim 2 has a usual printing layer (12) which usually used and formed ink in the surface of said card base material in a color change card according to claim 1, and said color change printing layer is characterized by said thing [ being formed so that at least a part may usually overlap a printing layer ].

[0007] Invention of claim 3 is characterized by said color change ink distributing a pigment which carried out the laminating of a high refractive-index layer and the low refractive-index layer into transparent data medium in a color change card according to claim 1 or 2.

[0008] Invention of claim 4 is characterized by forming said image-processing layer by printer of a sublimation imprint method in a color change card given in any 1 term of claim 1 to claim 3.

[0009] Invention of claim 5 is characterized by said image-processing layer containing a photograph of his face of a card carrier in a color change card given in any 1 term of claim 1 to claim 4.

[0010]

### [Embodiment of the Invention]

(The 1st operation gestalt) The gestalt of operation of this invention is hereafter explained further to details, referring to a drawing etc. Drawing 1 is the cross section showing the operation gestalt of the color change card by this invention. With this operation gestalt, the color change cards 10 are the card base material 11 and structure which usually contains the printing layer 12, the color change

printing layer 13, the middle protective layer 14, the image-processing layer 15, the surface-protection layer 16, etc.

[0011] The surface has flat reflector 11a, and serves as support of this card, and resin sheets, such as vinyl chloride resin, polyethylene terephthalate, and a polycarbonate, a metal sheet, or a paper sheet can be used for the card base material 11.

[0012] Usually, the printing layer 12 is a layer which was formed on the card base material 11 and usually formed images, such as an alphabetic character and a graphic form, using ink. As for the printing layer 12, at this time, it was desirable that that reflection density carried out to under 1.0 (Macbeth reflection density meter RD918 use), and it usually set it to 0.8 with this operation gestalt at it.

[0013] The color change printing layer 13 is the surface of the card base material 11, and is a layer which was formed so that it might usually lap with the surface of the printing layer 12 in part, and formed images, such as an alphabetic character and a graphic form, using the color change ink which carries out color change with the 1st angle alpha and the 2nd angle beta. What distributed the pigment which carried out the laminating of layers, such as silicon oxide of a high refractive index, titanium oxide, and an iron oxide, and the layers, such as a mica of a low refractive index, can be used for color change ink, for example into a transparent vehicle.

[0014] The middle protective layer 14 is formed on the color change printing layer 13, is a layer for protecting the color change ink layer 13, and can be formed by laminating transparent sheets, such as vinyl chloride resin, polyethylene terephthalate, and a polycarbonate, or applying OP ink etc.

[0015] The image-processing layer 15 is a layer which it was formed so that at least a part might overlap the color change printing layer 13, and was formed in ink with colored and transparency. This image-processing layer 15 can be formed by the card printer of for example, a sublimation imprint method. Here, using the color of sublimability, a sublimation imprint method evaporates the color with heat, and means the method of making the color which evaporated adhering or dyeing it a transferred object (here middle protective layer 14). In addition, after printing on the sheet, you may make it laminate the image-processing layer 15, when the protection interlayer 14 is a sheet.

[0016] The surface-protection layer 16 is formed on the image-processing layer 15, it is a transparent layer for protecting the image-processing layer 15, and with heat welding, adhesives, etc., can carry out the laminating of the transparent resin sheets, such as vinyl chloride resin, and can form them. Since the color is used and there is translatability to other synthetic resin (for example, card case) when the image-processing layer 15 is formed by the sublimation imprint method, it is desirable to prepare a protective layer by an imprint, coating, etc. on the field printed by the sublimation imprint.

[0017] Drawing 2 is drawing showing the color change printing layer of the color change card concerning this operation gestalt. The image is formed in the color change ink which distributed pigment 13a which carried out the laminating of a high refractive-index layer and the low refractive-index layer into data-medium 13b with the transparent color change printing layer 13. After it penetrates pigment 13a with a high refractive index while reflecting by pigment 13a and carrying out outgoing radiation of the incident light in the 1st direction of angle alpha, as shown in drawing 2 (A), it reflects on the surface of the usual printing layer 12 currently formed on reflector 11a of the card base material 11, or its reflector 11a, and outgoing radiation of it is carried out in the 2nd direction of angle beta.

[0018] With the thickness of that pigment 13a, either of the wavelength of a visible ray interferes at this time, and the relation between the reflected light of pigment 13a and the transmitted light serves as the following combination at it, as shown in drawing 2 (B).

[0019]  
[表1]

顔料の厚さ (nm)	反射光	透過光
① 40~60	銀色	透明
② 60~80	黄色	青色
③ 80~100	赤色	緑色
④ 100~140	青色	黄色
⑤ 120~160	緑色	赤色

[0020] When it follows, for example, the color change printing layer 13 looks silver at an angle of [  $\alpha$  ] the 1st, at the 2nd angle  $\beta$ , it will be visible to transparency.

[0021] Drawing 3 is drawing explaining the visual effect of the color change card concerning this operation gestalt. With this operation gestalt, as shown in drawing 3 (A), as a printing layer 12, the alphabetic character of "D" and the alphabetic character of a "DNP card" were printed, as a color change printing layer 13, the pigment of \*\* of [a table 1] was ink-ized, the design pattern was printed, and the stamp of the photograph of his face was usually carried out by the card printer as an image-processing layer 15 in the sublimation imprint method.

[0022] This color change card 10 shines and has the color change printing layer 13 visible to "blue" with the image-processing layer 15, when it sees at an angle of [  $\alpha$  ] the 1st, as shown in drawing 3 (B). As shown in drawing 3 (C), when it sees at an angle of [  $\beta$  ] the 2nd, since it is almost transparent, only its upper image-processing layer 15 can be subsequently, seen [ the color change printing layer 13 is "light yellow", and ] clearly.

[0023] According to this operation gestalt, with an angle, the color change printing layer 13 switches and it is visible, and it interferes with the upper image-processing layer 15, it is, and the visual effect which cannot be expressed in each layer simple substance can be brought about. Moreover, it can distinguish from a counterfeit card, without using special distinction equipment, since the effect of this image switch does not show up with a color copier etc. even if it copies the appearance from a fixed angle.

[0024] Without being limited to the operation gestalt explained above, various deformation and modification are possible and they are also within the limits with equal this invention. For example, a printing layer can also usually be printed still more nearly partially on a color change printing layer. The image of an image-processing layer can form the information according to individual, may be suitable for an item or a small lot production, may form images other than the information for certification on a photograph of his face etc., such as taste-information on a pet and others, and may be a mark, an emblem, etc. of a company further. As for the image of a color change printing layer, it is desirable to carry out correspondence \*\*\*\*\* formation with the image of an image-processing layer. For example, the photograph of his face of a card carrier, the mark of the organization where the carrier belongs, etc. are raised.

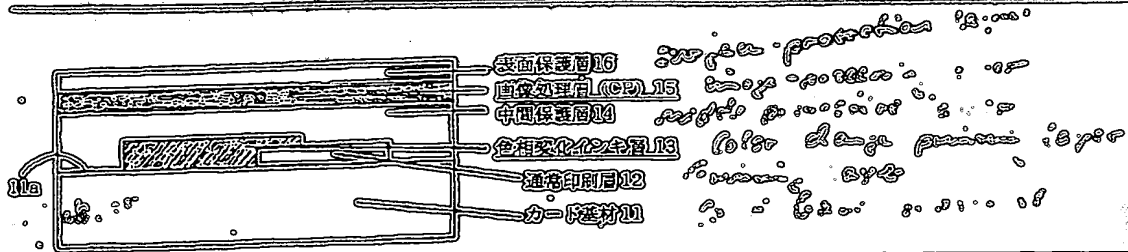
[0025] In addition, since a color change printing layer tends to be influenced by the color of a substrate, it is desirable the card base material 11 and to usually choose the color of the printing layer 12 suitably. For example, when a background is white, according to a background, it is again reflected in origin, and the complementary color which is a transparency component is absorbed by the component which is an original reflected color, and reduces the color effect. When a background is black, the transmitted complementary color component is absorbed by the black of a background, and only the original reflected light is recognized.

[0026]

[Effect of the Invention] Since the image-processing layer which is transparent by colored was prepared on the color change printing layer according to this invention as explained in detail above, with the 1st or 2nd angle, a color can be changed and the same effect as a transparency hologram is acquired. Therefore, easy and a low price can be provided with a card with a visual effect and the forged prevention effect.

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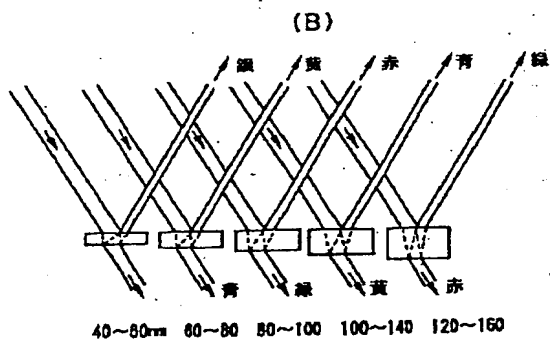
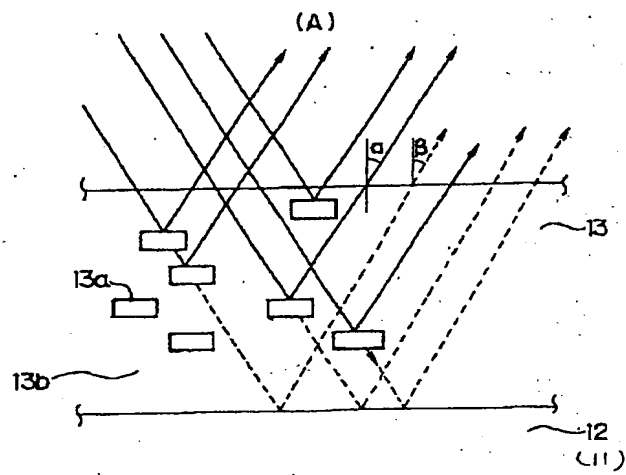
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Drawing selection: drawing1

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Drawing selection [drawing 2]

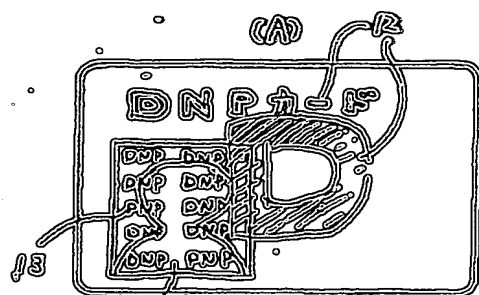
12.1



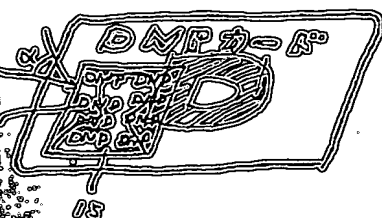
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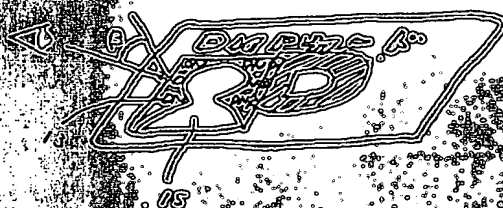
Drawing selection drawing 3



(B)



(C)



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